

APPENDIX C - DESCRIPTION OF ALTERNATIVES

This appendix contains a brief geographic description of the alternative transmission line routes for NTP. Photographs of representative scenes along the alternative routes are shown on Figure C-1 and referenced by location on Figure C-2.

EASTERN AREA - SHIPROCK TO MOENKOPI

Glen Canyon 1 (GC1)—Links 100, 120, 460, 461, 463, 501, 502, 504, 561, 580, 581, 586, 587, 620, 621, 627, 1389, 1393, 1397, 1383, 1384, 1386 (260.6 miles)

GC1 connects the Shiprock and Moenkopi substations via the Honey Draw Substation site. GC1 crosses approximately 260.6 miles and primarily follows existing transmission lines. The initial portion of the route is located in New Mexico along Links 100, 120, and a portion of 460. In New Mexico, GC1 parallels an existing 230kV transmission line that exits the Shiprock Substation and crosses The Hogback ridge (Photograph 1) and the San Juan River (Photograph 2). On the Navajo Reservation in New Mexico, GC1 crosses portions of five Navajo Chapters—Hogback, Shiprock, Cudei, Beclabito, and Teec Nos Pos. The route crosses Interstate 666 approximately five miles north of the town of Shiprock.

In Arizona, GC1 continues to parallel the same existing 230kV transmission line along Links 460 and 461. This portion of the route also generally parallels U.S. Highway 160 near the towns of Red Mesa, Mexican Water, and Tes Nez Iah. In this area, GC1 crosses the Teec Nos Pos, Red Mesa, Mexican Water, and Dennehotso chapters.

Northeast of Dennehotso the route follows Links 463, 501, 502, 504, and 561. Here the route separates from the existing line and continues southwest and west along the eastern edge of Red Point Mesa, across Church Rock Valley, south of the town of Kayenta, and across the northern edge of Black Mesa (Photographs 3 and 4). This section of the route crosses portions of the Dennehotso, Kayenta, and Chilchinbito chapters for 45.5 miles before converging again with the existing 230kV line in the Long House Valley.

From Long House Valley, GC1 continues west along Links 580 and 581 immediately north of the town of Shonto (Photograph 5) and north of Square Butte. GC1 continues northwest along Link 586, crosses Chaol Canyon (Photograph 6) at the intersection of Links 586 and 587, and continues south of Lechee Rock. Immediately south of the Navajo Power Plant, GC1 continues to parallel the existing line, but separates into a new corridor for three miles between the city of Page and town of Lechee on Link 621 (Photograph 7). The Honey Draw Substation site is located near the junction of Links 621 and 627 in the Honey Draw area, approximately one mile west of the town of Lechee (Photograph 8). Chapters crossed in this area include Shonto, Inscription House, Kaibito, and Lechee.

Link 627, which consists of 1.2 miles of new corridor, connects with an existing 345kV line. GC1 parallels the 345kV line into the Moenkopi Substation along Links 1389, 1393, 1397, 1383, 1384, and 1386 south of the Page area (Photographs 9 and 10). Chapters crossed in this area include Lechee, Copper Mine, Bodaway, and Cameron.

Kaibito 1 (K1)—Links 100, 120, 460, 461, 463, 501, 502, 504, 561, 580, 581, 586, 1390, 1391, 1393, 1397, 1383, 1384, 1386 (244.7 miles)

K1 is 244.7 miles long and is identical to GC1 until the intersection with Link 587. At this point, Link 1390 separates K1 from the existing transmission line and continues west across the Kaibito Plateau along a new corridor (see Photograph 6). The route follows this new corridor for 18.5 miles and then intersects a 345kV transmission line. K1 crosses the 345kV line, follows Link 1391 for 1.1 miles, and then intersects Link 1393, a second 345kV line. From this point south into Moenkopi, K1 is identical to GC1 as described above.

Central 1 (C1)—Links 180, 240, 300, 360, 640, 700, 701, 780 (186.7 miles)

C1 crosses 186.7 miles and primarily follows existing transmission lines. The initial portion of this route is located in New Mexico along Links 180, 240, 300, 360, 640, and a portion of 700. Along Link 700 C1 enters Arizona for the remainder of the route.

In New Mexico, C1 parallels two existing 345kV transmission lines that cross the San Juan River (Photograph 11). The route separates from these two existing lines to cross through The Hogback ridge along Link 360, which would be a new corridor, for 10.4 miles. The route then rejoins an existing 500kV transmission line for the rest of its length. On the Navajo Reservation, C1 crosses portions of four Navajo chapters—San Juan, Nenahnezad, Sanostee, and Shiprock. This portion of the route crosses Interstate 666 north of Table Mesa, and proceeds west to the south of Mitten Rock.

In Arizona, C1 crosses the Chuska Mountains in the Buffalo Pass area (Photographs 12 and 13), then proceeds just to the north of the town of Lukachukai (Photograph 14). Continuing southwest, it crosses I-191 in the Chinle Wash area (Photograph 15). This section of the route crosses portions of the Red Valley, Cove, Round Rock, Lukachukai, Many Farms, and Chinle chapters.

The route continues west along Links 701 and 780, which are located north of the town of Cottonwood. It crosses Tribal Route 4 as it enters the Hopi Reservation. At this point the route passes to the north of the town of Hard Rocks and to the south of Dinnebito, across Route 264 and south of the town of Coal Mine Mesa. The last segment of the route enters back on to the Navajo Reservation and crosses the Little Colorado River just east of Moenkopi. Navajo chapters crossed in this area include Tselani/Cottonwood, Tachee/Blue Gap, Whippoorwill Spring, Piñon, Hard Rock, Coal Mine Mesa, and Cameron. On Hopi lands, portions of Second and Third Mesa are crossed.

Central 2 (C2)—Links 100, 120, 460, 462, 780 (211.0 miles)

C2 is 211.0 miles long and is the same as GC1 from the Shiprock Substation to the junction with Link 462, which occurs east of the town of Red Mesa. At this point the line separates from the existing transmission line and continues south, following a new corridor for 65.7 miles between Sweetwater and Immanuel Mission. The route crosses I-191 south of the town of Rock Point, and continues south passing between the towns of Many Farms and Rough Rock. The chapters crossed in this area include

Sweetwater, Rock Point, Rough Rock, and Many Farms. C2 then joins an existing 500kV transmission line at Link 780, just east of Lohali Point (Photograph 16), and follows the same path as C1 into Moenkopi.

WESTERN AREA - MOENKOPI TO MARKETPLACE

Northern 1 West (N1W)—Links 1400, 1401, 1660, 1740, 1741, 1790, 2060, 2200, 2180 (217.0 miles)

N1W connects the Moenkopi and Marketplace substations across a distance of 217.0 miles, and parallels existing transmission lines along its entire route. A major portion of the route is located in Arizona along Links 1400, 1401, 1660, 1740, 1741, 1790, and a portion of 2060. The remainder is located in Nevada.

In Arizona, Links 1400 and 1401 climb west onto the Coconino Plateau paralleling an existing 500kV line (Photograph 17), and enter the Kaibab National Forest. In this area N1W crosses the Cameron Chapter along portions of Link 1400 west of the Moenkopi Substation. Proceeding west along Link 1660, N1W crosses I-180 after leaving the Forest and continues across the Boquillas Ranch. N1W continues west across the Aubrey Valley along Links 1740 and 1741 (Photograph 18).

At Link 1790, N1W enters the Hualapai Indian Reservation and continues west across Tribal Route 18 and north of the town of Peach Springs. It then crosses through the Music Mountains and down the Grand Wash Cliffs to an area immediately north of Red Lake in the Hualapai Valley (Photograph 19). At this point, Link 2060 continues west (see Photograph 24), north of Dolan Springs; crosses I-93; enters the Lake Mead NRA; and crosses the Colorado River (see Photograph 25).

In Nevada, N1W passes through the Eldorado Mountains, crosses I-95, and turns north along Links 2200 and 2180 where it parallels several transmission lines. The route then continues past the McCullough and Eldorado substations into the Marketplace Substation (see Photograph 26).

Northern 2 (N2)—Links 1400, 1401, 1660, 1740, 1741, 1742, 1800, 1980, 2020, 2060, 2200, 2180 (225.1 miles)

N2 is 225.1 miles long and parallels existing transmission lines for the majority of its length. N2 is common with N1W up to Link 1742. At this point the route enters a new corridor. It follows this new corridor for 41.5 miles, crossing Route 66 and passing to the east and south of Nelson. Along Links 1800 and 1980, N2 turns west (Photograph 20) and crosses Route 66 again southwest of the town of Truxton. N2 continues through the Music Mountains, descends the Grand Wash Cliffs, joins existing 500kV and 345kV transmission lines along Link 2020, and continues northwest to Red Lake in the Hualapai Valley (see Photograph 24). From this point N2 is identical to N1W as it continues across the Colorado River and into the Marketplace Substation (see Photographs 25 and 26).

Southern 2 (S2)—Links 1420, 1421, 1480, 1520, 1640, 1680, 1720, 1960, 2000, 2002, 2006, 2020, 2060, 2200, 2180 (247.7 miles)

S2 connects the Moenkopi and Marketplace substations across a distance of 247.7 miles, primarily along existing transmission line, pipeline, and fiber optic corridors. Portions of this route also would require new corridor.

S2 exits the Moenkopi Substation area on Link 1420 and heads southwest across the Cameron Chapter of the Navajo Nation (see Photograph 10). Link 1420 is a new corridor for 4.6 miles until it joins with two existing 500kV transmission lines northwest of Gray Mountain. Links 1421, 1480, and 1520 pass to the south of Additional Hill and cross I-180 at the boundary of the Kaibab National Forest. Continuing southwest, the route crosses State Route 64 where Link 1680 separates from the existing transmission lines to parallel a fiber optic corridor to the west for 21.7 miles. Link 1720 continues south of Seligman and across I-40 along a combined fiber optic and pipeline corridor. Continuing west, Link 1720 departs from the pipeline and fiber optic corridor in the Juniper Mountains and again crosses Interstate 40 (Photograph 21). S2 continues west on Link 1960 along an existing pipeline corridor and then joins an existing 230kV transmission line along Link 2000, continuing west until Milepost 20.7. At Milepost 20.7 along Link 2000, existing 345kV and 500kV transmission lines intersect with the 230kV line and head north towards Hackberry. S2 turns north and parallels the two lines to a point approximately four miles south of Hackberry. From here, S2 departs from the existing lines into new corridor for 5.6 miles to the west around Hackberry. Link 2000 rejoins the existing 345kV and 500kV lines north of Hackberry and continues north along Link 2006, crossing Route 66 (Photograph 22) and the Truxton Wash (Photograph 23). At this point, Link 2006 joins into Link 2020, which parallels the Grand Wash Cliffs until its intersection with other existing transmission lines north of Red Lake in the Hualapai Valley (Photograph 24). From here S2 is identical to N1W and N2 as it continues west across the Colorado River and into the Marketplace Substation (Photographs 25 and 26).

WESTERN AREA - MOENKOPI TO MEAD

Northern 3 (N3)—Links 1400, 1401, 1660, 1740, 1741, 1790, 2040, 2080 (199.3 miles)

N3 is 199.3 miles long and parallels existing transmission lines the entire length. N3 is identical to N1W up to Link 2040. Immediately north of Red Lake, N3 parallels existing 345kV and 500kV transmission lines to the northwest across the Hualapai Valley and through the White Hills (see Photograph 24). After crossing US 93, the route continues west into the Lake Mead NRA and crosses the Colorado River south of Willow Beach (Photograph 27).

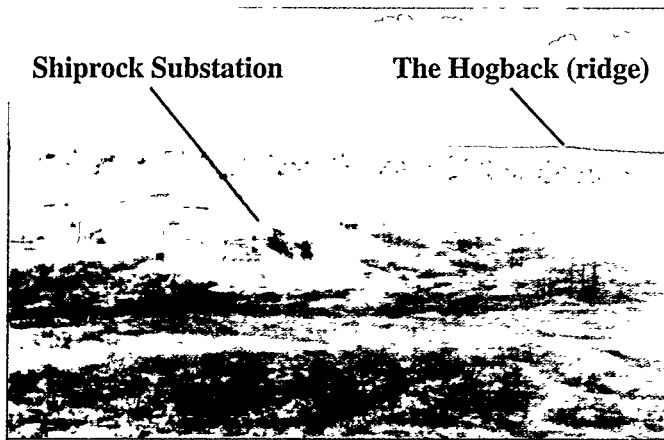
In Nevada, N3 passes through the Eldorado Mountains along Link 2040 and then turns northwest toward its termination at the Mead Substation (Photograph 28).

**Northern 4 (N4)—Links 1400, 1401, 1660, 1740, 1741, 1742, 1800, 1980, 2020, 2040, 2080
(207.4 miles)**

N4 is 207.4 miles long and parallels existing transmission lines for the majority of its length. This route is identical to N2 up until the intersection point north of Red Lake in the Hualapai Valley (see Photograph 24). Instead of continuing to follow the existing 500kV line to the west, this route parallels the existing 345kV and 500kV lines to the northwest through the White Hills, Detrital Valley across the Colorado River, and into the Mead Substation as described in N3 above (see Photographs 27 and 28).

Southern 4 (S4)—Links 1420, 1421, 1480, 1520, 1640, 1680, 1720, 1960, 2000, 2002, 2006, 2020, 2040, 2080 (230.0 miles)

S4 connects the Moenkopi and Mead substations over a total distance of 230.0 miles. This route follows a combination of existing transmission lines, pipelines, fiber optic cables, and new corridor. S4 is identical to S2 up to the intersection point at Red Lake in the Hualapai Valley (see Photograph 24). From there, S4 follows a route identical to alternative N3 across the Colorado River and into the Mead Substation (see Photographs 27 and 28).

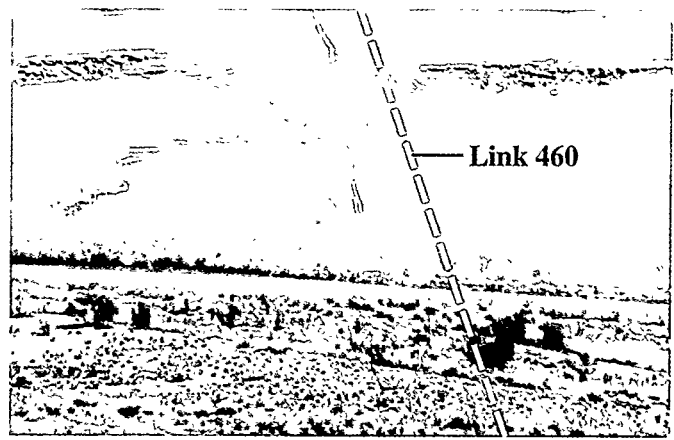


Photograph No. 1: Shiprock Substation

View Direction: West

Applicable Routes: All eastern routes (Links 100,180)

Description: The existing Shiprock Substation is visible in the foreground with The Hogback (ridge) in the background.

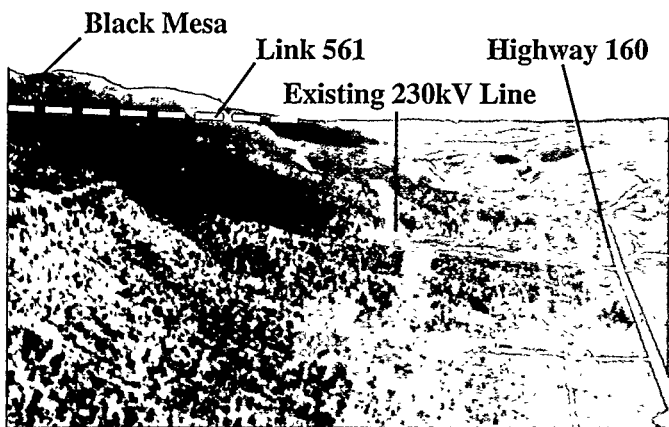


Photograph No. 2: Northern crossing of the San Juan River

View Direction: East

Applicable Routes: GC1, K1, C2 (Link 460)

Description: Existing 230kV line is paralleled at this location of the San Juan River crossing.

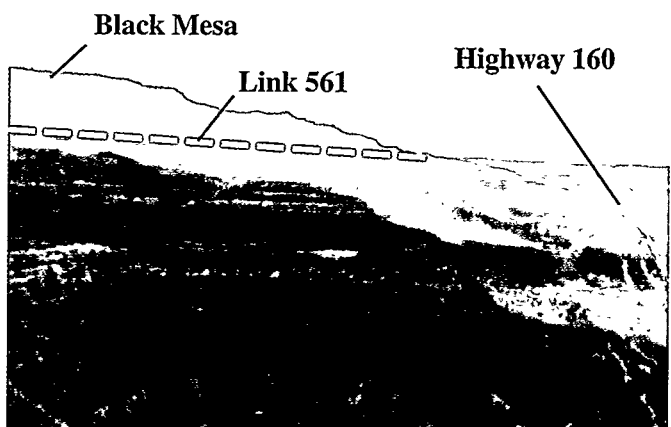


Photograph No. 3: Marsh Pass Area

View Direction: West

Applicable Routes: GC1, K1 (Link 561)

Description: Highway 160 is visible to the right; the existing 230kV line right-of-way is visible in the center. Link 561 is located on top of the bench (upper left of the photograph).



Photograph No. 4: Marsh Pass Area

View Direction: West

Applicable Routes: GC1, K1 (Link 561)

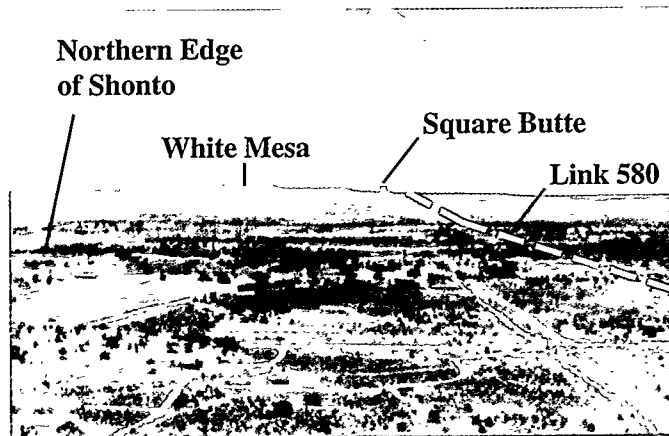
Description: View of Link 561 on top of the bench below the northern edge of Black Mesa. Highway 160 is visible (far right of the photograph).

Alternative Route Photographs

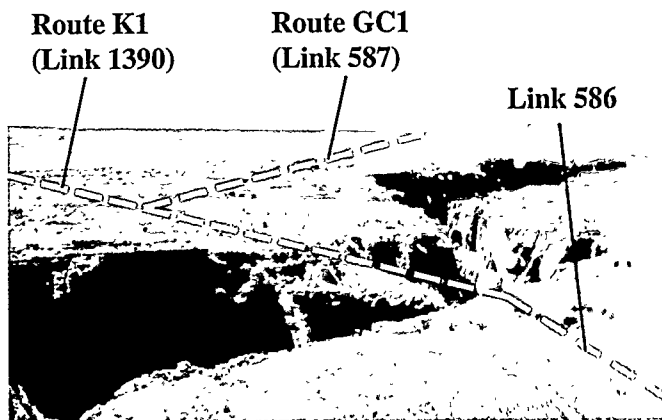
Navajo Transmission Project

Note: Route locations are approximate

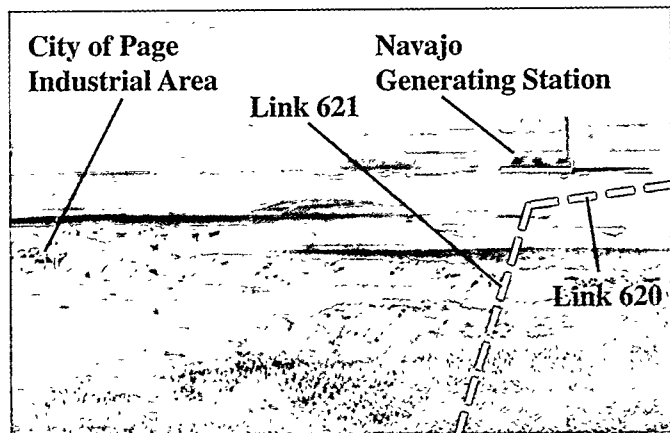
Figure C-1



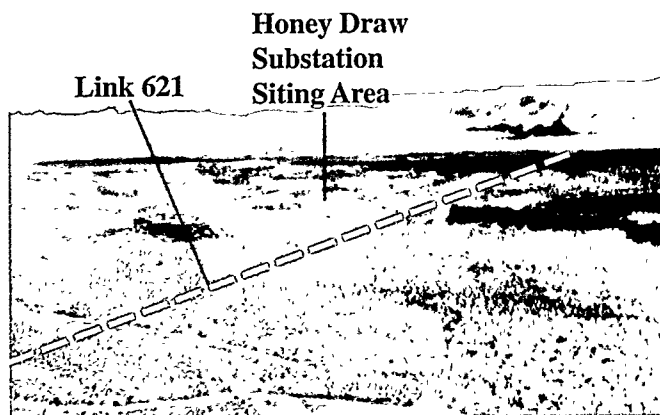
Photograph No. 5: Shonto Area
View Direction: West
Applicable Routes: GC1, K1 (Link 580)
Description: View of the area between Shonto and the existing 230kV transmission line that would be paralleled. Square Butte and White Mesa are in the distance.



Photograph No. 6: Chaol Canyon
View Direction: Northwest
Applicable Routes: GC1 (Links 586, 587), K1 (Links 586, 1390)
Description: Crossing of Chaol Canyon parallel to the existing 230kV line.



Photograph No. 7: Page Area
View Direction: Northeast
Applicable Routes: GC1 (Links 620, 621)
Description: View of the Navajo Generating Station (upper right), City of Page industrial area (center left), and Glen Canyon NRA in the background north of alternative route GC1.



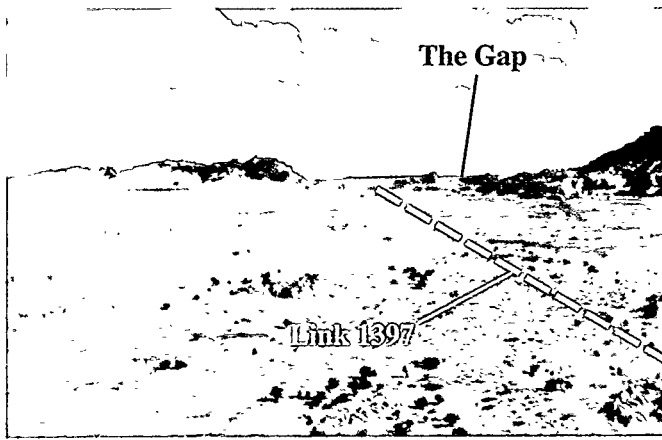
Photograph No. 8: Honey Draw Substation Site
View Direction: Southwest
Applicable Routes: GC1 (Link 621)
Description: Approximate location of Honey Draw Substation site south of Page and west of Lechee, located along Link 621.

Alternative Route Photographs

Navajo Transmission Project

Note: Route locations are approximate

Figure C-1

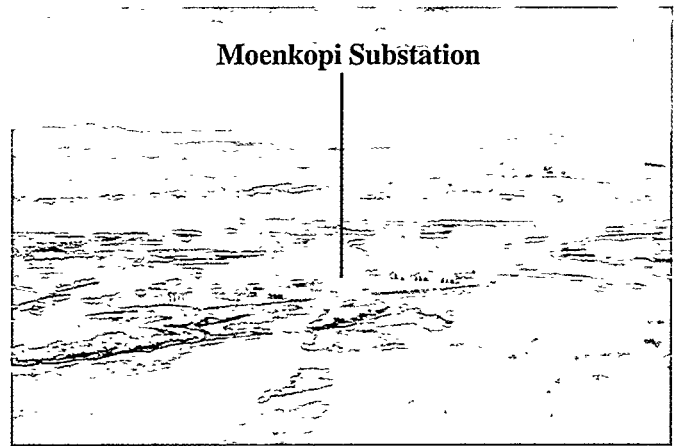


Photograph No. 9: North of The Gap

View Direction: South

Applicable Routes: K1, GC1 (Link 1397)

Description: Link 1397 parallels one of two existing 345kV lines that converge to the south at The Gap.

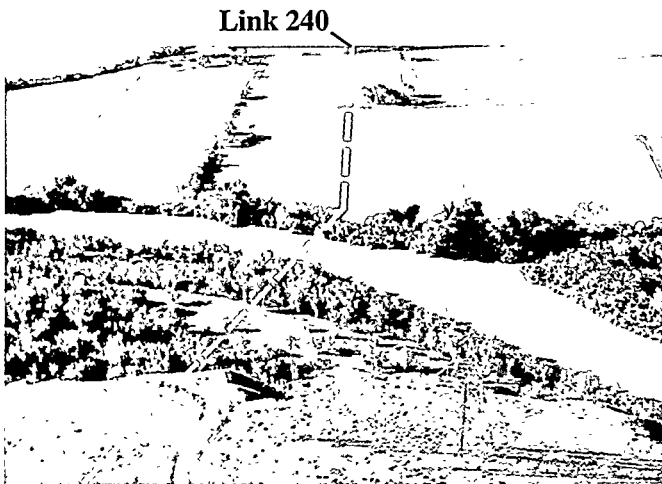


Photograph No. 10: Moenkopi Substation

View Direction: Southwest

Applicable Routes: All alternative routes

Description: View of the existing Moenkopi Substation with the San Francisco Peaks in the distance.

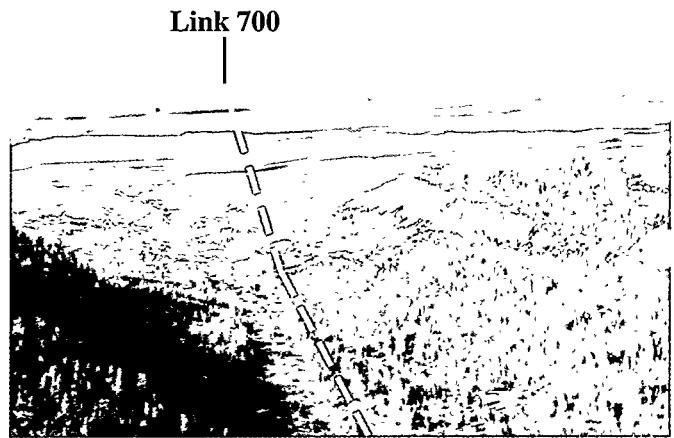


Photograph No. 11: Southern crossing of the San Juan River

View Direction: North

Applicable Routes: C1 (Link 240)

Description: Existing 345kV lines would be paralleled at this location of the San Juan River crossing.



Photograph No. 12: Chuska Mountains

View Direction: Northeast

Applicable Routes: C1 (Link 700)

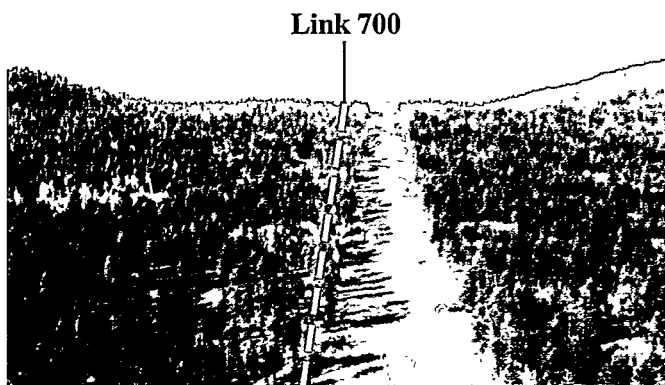
Description: View from the eastern side of the Chuska Mountains where Link 700 parallels the existing 500kV line.

Alternative Route Photographs

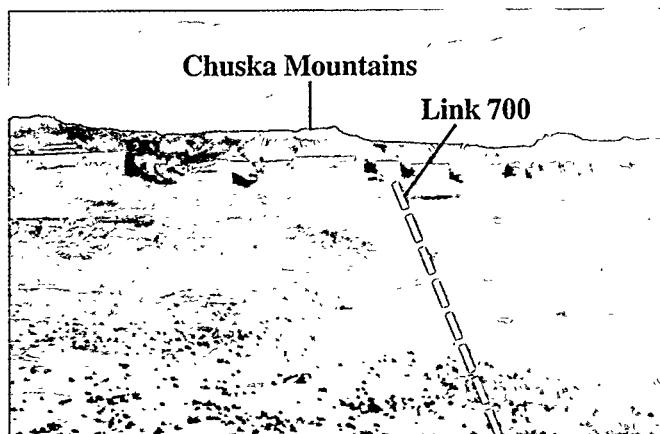
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Note: Route locations are approximate

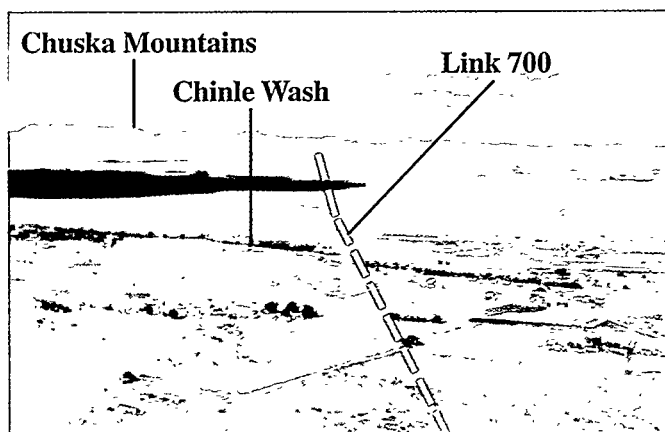
Figure C-1



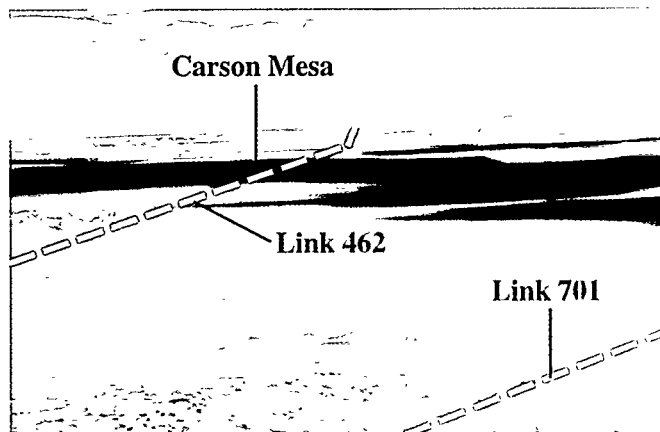
Photograph No. 13: Buffalo Pass/Chuska Mountains
View Direction: West
Applicable Routes: C1 (Link 700)
Description: Ponderosa pine forest at Buffalo Pass showing clearing for the existing 500kV line paralleled by Link 700.



Photograph No. 14: Chuska Mountains
View Direction: East
Applicable Routes: C1 (Link 700)
Description: View of the western side of the Chuska Mountains, north of Lukachukai. Link 700 parallels the existing 500kV line in this area.



Photograph No. 15: Chinle Wash
View Direction: West
Applicable Routes: C1 (Link 700)
Description: View of Chinle Wash including agricultural and residential areas. The Chuska Mountains are in the background.



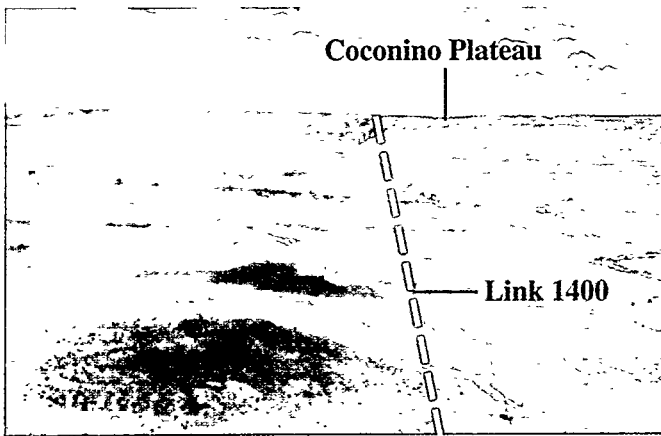
Photograph No. 16: Chinle Valley/Carson Mesa
View Direction: North
Applicable Routes: C2 (Link 462) and C1 (Link 701)
Description: View from the existing 500kV line and Link 701 towards Carson Mesa along Link 462.

Alternative Route Photographs

Navajo Transmission Project

Note: Route locations are approximate

Figure C-1

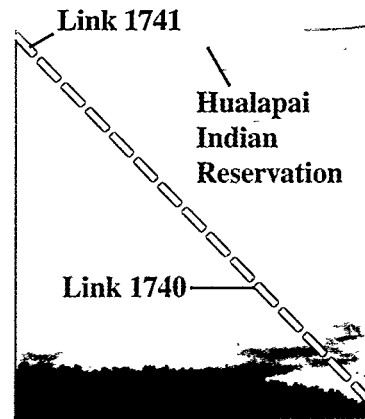


Photograph No. 17: Painted Desert

View Direction: West

Applicable Routes: N1W, N2, N3, N4 (Link 1400)

Description: View from the Moenkopi Substation toward the Coconino Plateau along the existing 500kV line paralleled by Link 1400.

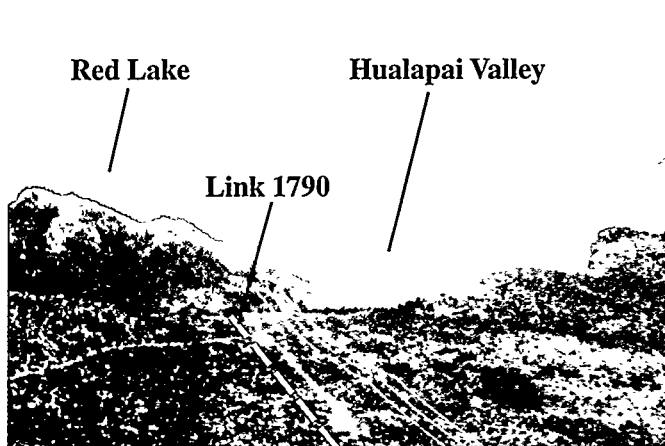


Photograph No. 18: Aubrey Valley

View Direction: West

Applicable Routes: N1W, N2, N3, N4 (Links 1740, 1741)

Description: View from the top of the Aubrey Cliffs into the Aubrey Valley with the Hualapai Reservation boundary visible in the background. Links 1740 and 1741 parallel the existing 500kV line.

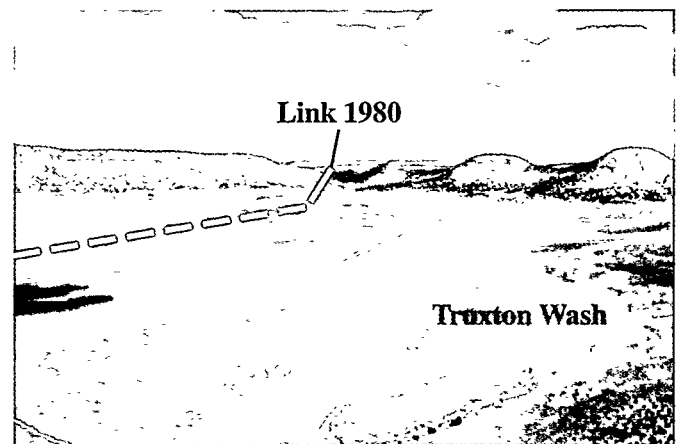


Photograph No. 19: Grand Wash Cliffs

View Direction: West

Applicable Routes: N1W, N3 (Link 1790)

Description: View from the top of the Grand Wash Cliffs into the Hualapai Valley and Red Lake area. Link 1790 parallels the existing 500kV line.



Photograph No. 20: Truxton Plains/Truxton Wash

View Direction: Northeast

Applicable Routes: N2, N4 (Link 1980)

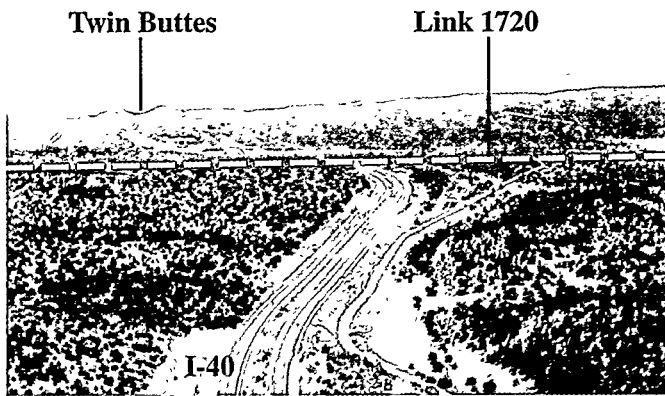
Description: View of the Truxton Plains and Truxton Wash in the vicinity of Link 1980.

Alternative Route Photographs

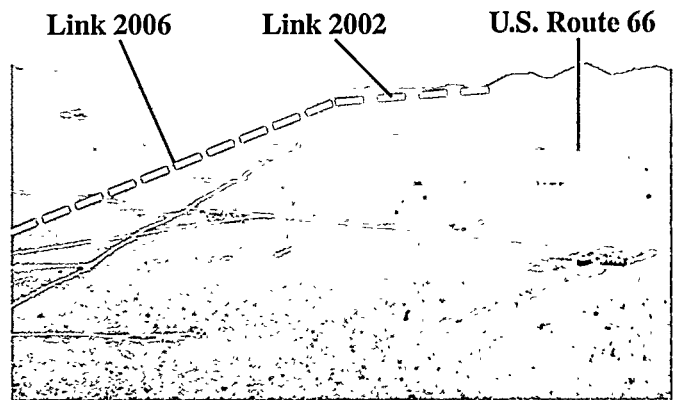
Navajo Transmission Project

Note: Route locations are approximate

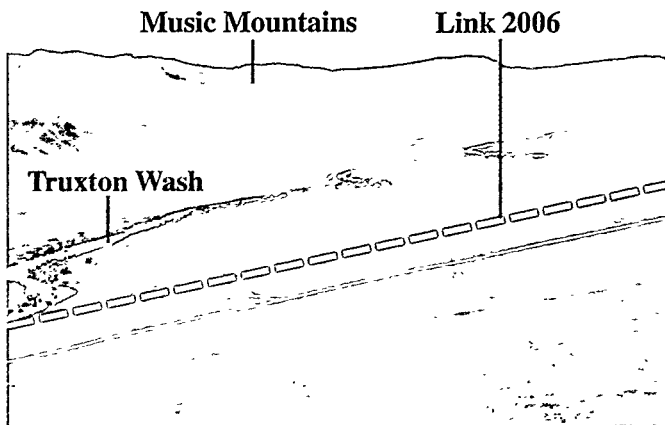
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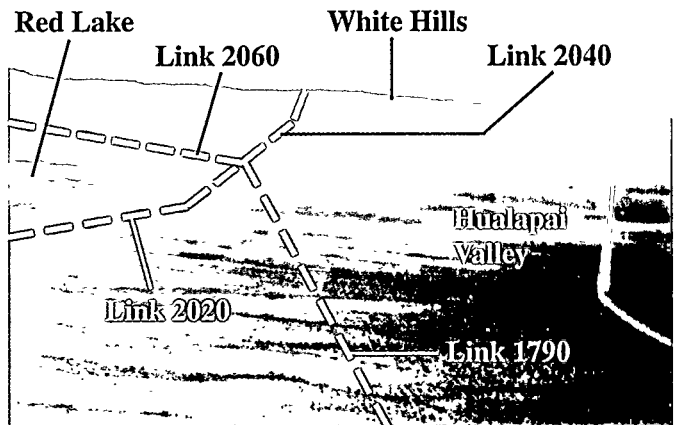
Photograph No. 21: West of Seligman
View Direction: East
Applicable Routes: S2, S4 (Link 1720)
Description: View near the crossing of Interstate 40 in the area of Link 1720.



Photograph No. 22: North of Hackberry
View Direction: South
Applicable Routes: S2, S4 (Links 2006, 2002)
Description: View of existing 345kV and 500kV lines along Link 2006 that would be paralleled. Historic U.S. Route 66 crossing and Link 2002 are visible in the background.



Photograph No. 23: Truxton Wash
View Direction: East
Applicable Routes: S2, S4 (Link 2006)
Description: Existing 345kV and 500kV lines would be paralleled near the crossing of the Truxton Wash. The Music Mountains are visible in the background.



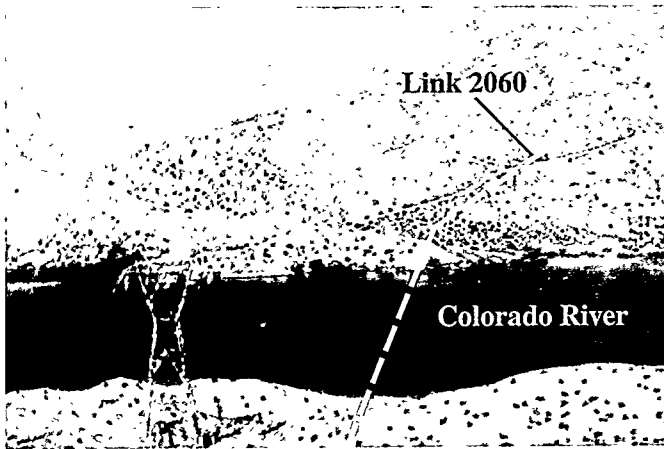
Photograph No. 24: Hualapai Valley and Red Lake
View Direction: West
Applicable Routes: N1W, N2, S2 (Links 1790, 2020, 2060) and N3, N4, S4 (Links 1790, 2020, 2040)
Description: View to the junction of Links 1790, 2020, 2060 and 2040 in the Hualapai Valley. At this point, alternative routes N1W, N2, and S2 parallel an existing 500kV transmission line west to the southern crossing of the Colorado River (Link 2060). N3, N4, and S4 diverge to the northwest parallel to existing 345kV and 500 kV lines (Link 2040) to the northern crossing of the Colorado River.

Alternative Route Photographs

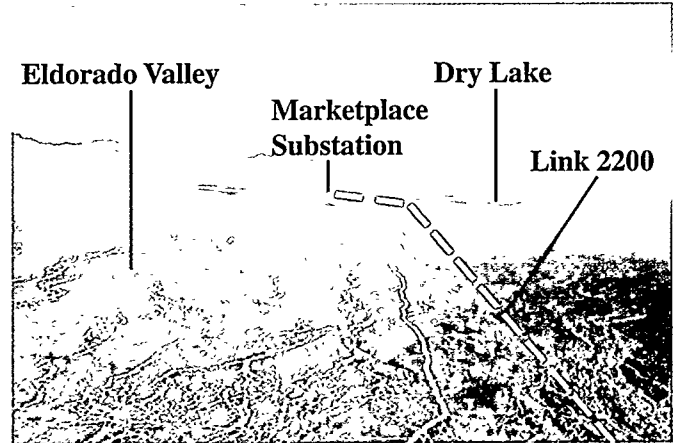
Navajo Transmission Project

Note: Route locations are approximate

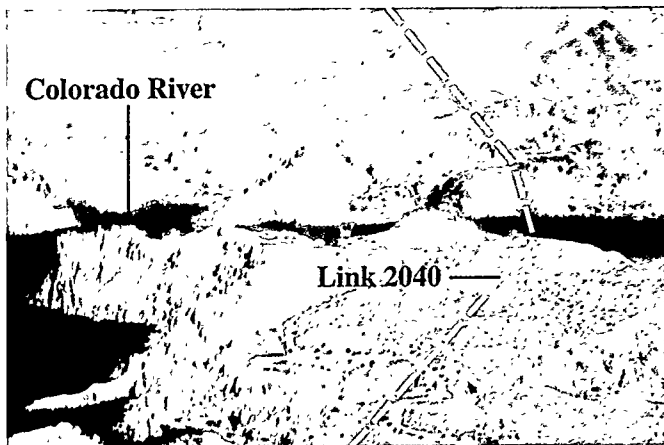
Figure C-1



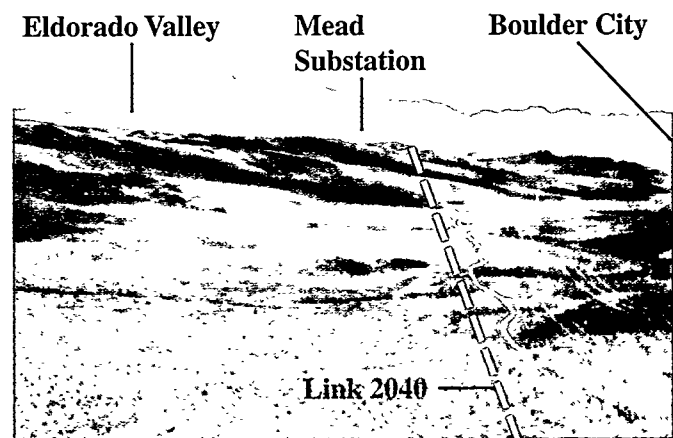
Photograph No. 25: Colorado River
View Direction: West
Applicable Routes: N1W, N2, S2 (Link 2060)
Description: View of the southern crossing of the Colorado River on the Lake Mead NRA. An existing 500kV line would be paralleled in this area.



Photograph No. 26: Marketplace Substation
View Direction: North
Applicable Routes: N1W, N2, S2 (Links 2200, 2180)
Description: View to the Marketplace Substation in the Eldorado Valley. Dry Lake is in the background. Numerous existing transmission lines would be paralleled by Link 2200 in this area.



Photograph No. 27: Colorado River
View Direction: East
Applicable Routes: N3, N4, S4 (Link 2040)
Description: View of the northern crossing of the Colorado River south of Willow Beach. Existing 345kV and 500kV lines would be paralleled. (Construction of the 500kV line has been completed since this area was photographed.)



Photograph No. 28: Mead Substation
View Direction: Northwest
Applicable Routes: N3, N4, S4 (Links 2040, 2080)
Description: View to the Mead Substation south of Boulder City. Existing 345kV and 500kV lines would be paralleled in this area immediately west of the Eldorado Mountains and into the Mead Substation.

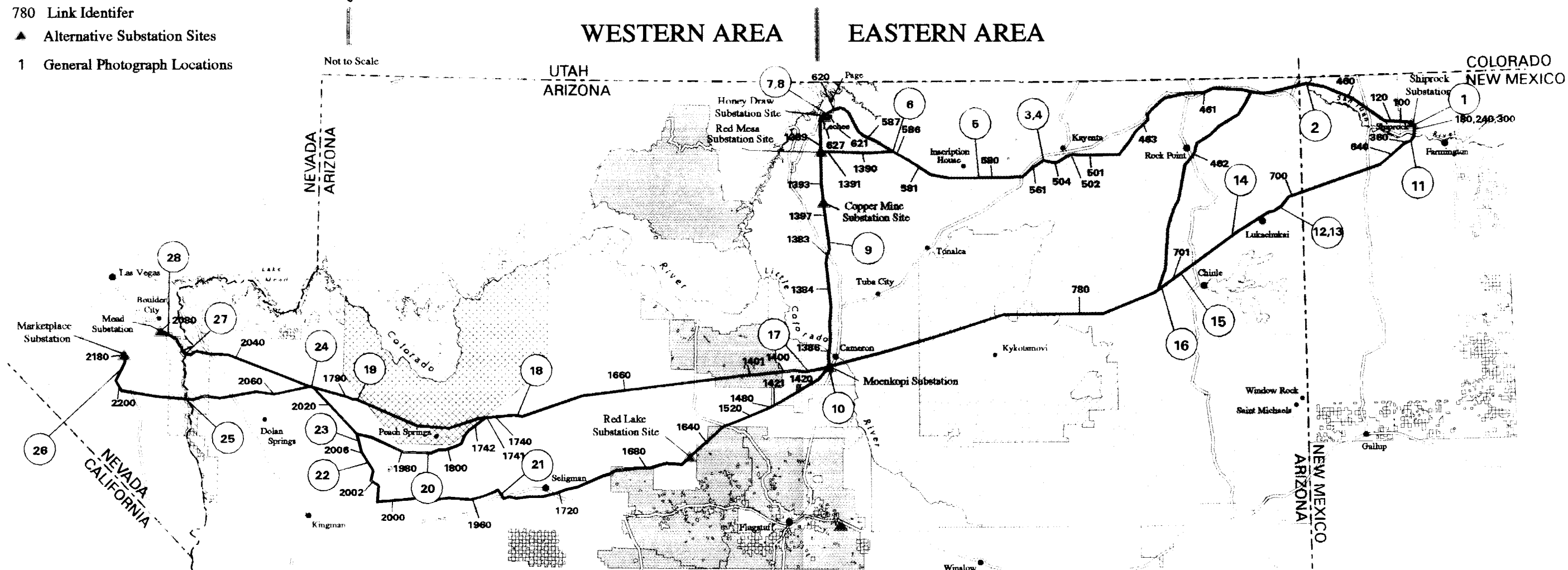
Alternative Route Photographs

Navajo Transmission Project

Note: Route locations are approximate

Figure C-1

— Alternative Transmission Line Route
 780 Link Identifier
 ▲ Alternative Substation Sites
 1 General Photograph Locations



Navajo Transmission Project
Figure C-2